



# US Army Corps of Engineers

Institute for Water Resources

BUILDING STRONG®

## Responses to Climate Change

**Status:** **Project Manager:**

In Progress [Rolf Olsen](#)

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**Purpose:** The purpose of this project is to develop and begin implementing practical, nationally consistent, and cost-effective approaches and policies to reduce potential vulnerabilities to the Nation's water and coastal infrastructure and natural environment resulting from climate change and variability.

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**Objective:** The objective of the Responses to Climate Change Program is to provide the necessary means to adapt USACE projects, systems, and programs to climate change.

The Responses to Climate Change Program recognizes that USACE and its partners have reached a "tipping point" where we now have a sufficient understanding of climate change processes to apply adaptation measures at a local to regional scale.

Building on existing science and knowledge, the RCC Program is developing methods, policies, and processes for effective adaptation of our projects, systems, and programs to climate change. We must also develop methods, policies, and processes to assess the effectiveness of climate change adaptation. We anticipate that assessment will include an evaluation of how well alternative adaptation measures improve system flexibility to perform well over a wide range of future scenarios.

The program will develop and conduct vulnerability stress-tests within the Civil Works (CW) Operations and Maintenance (O&M) portfolio of constructed and natural projects with a focus on highest priorities and the existing portfolio (i.e., will not address the portfolio of authorized but not yet constructed projects). This will include demonstrations of hydrologic frequency analysis under changing conditions and adaptation opportunities presented by more flexible water control and reservoir systems operations.

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**Benefits:** The operations and water management control activities associated with the existing capital stock of USACE water projects provides the largest challenge given future climate change and variability.

This effort will provide planning and engineering guidance, processes, methods, and tools to ensure future infrastructure is designed to be sustainable and robust to a range of potential changes.

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**Progress:** USGS Circular 1331, providing a foundation for water resources adaptation planning and policies, was published in February 2009.

Initial discussions have been held with USGS and NOAA about building on the USGS Coastal Vulnerability Index for use by USACE in a detailed manner, similar to what was done for Park Service. (Sea Level and Coastal Storm Adaptation)

Numerous briefings at senior leader level in HQ have been provided, as well as conference papers and presentations (Climate Change Adaptation Communication). Two journal and two white papers are in preparation

USACE hosted an expert workshop on "Nonstationarity, Hydrologic Frequency Analysis, and Water Management" 13-15 January 2010 in Boulder, CO. This workshop was an activity of Climate Change and Water Working Group (CCAWWG) to address needs identified in USGS Circular 1331. The workshop leveraged USACE Campaign Plan Goal 2 Systems Approach (Actions for Change Program). (Hydrology to Support Adaptation and Water Management Adaptation.) The organizing committee also included representatives from USGS, Reclamation, NOAA, EPA, and Colorado State University. Discussions during the workshop addressed whether assumptions of stationarity are valid, use of different statistical models in nonstationarity conditions, trend analyses, how to use the output from global climate models (GCM), and how to treat uncertainty in planning, design, and operations. National and international experts on climate change hydrology. This will result in a special issue of the Hydrological Sciences Journal, which is part of our approach to develop peer-reviewed, legally justifiable methods to support our work.

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**Products:** • [Report by USACE, USGS, Reclamation, NOAA, 02/1/2009](#)

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**Related Links:** • [Responses to Climate Change](#) (*project web site*)

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**Partners:** • [National Oceanic and Atmospheric Administration](#)  
• [Reclamation](#)  
• [U.S. Geological Survey](#)